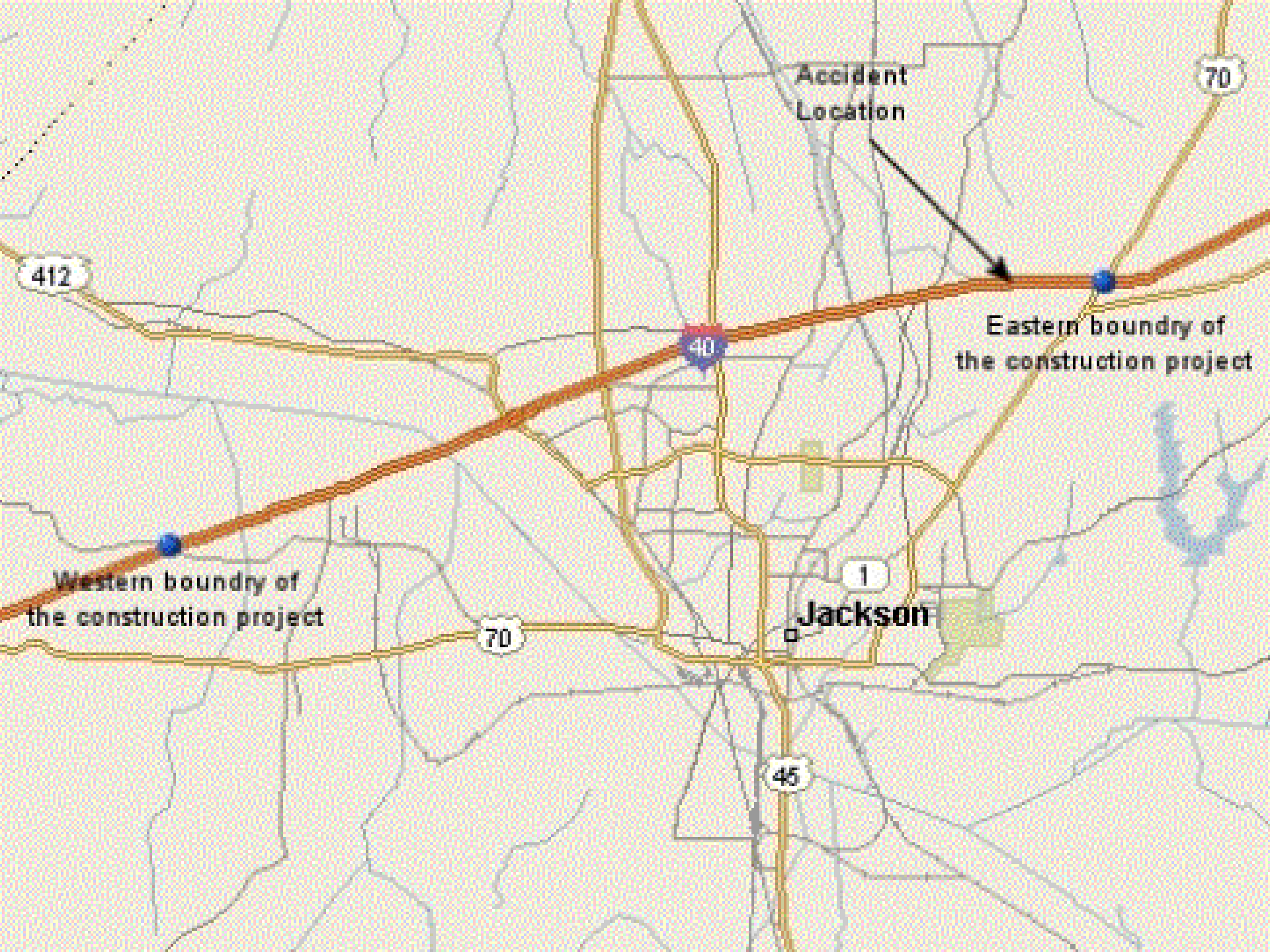
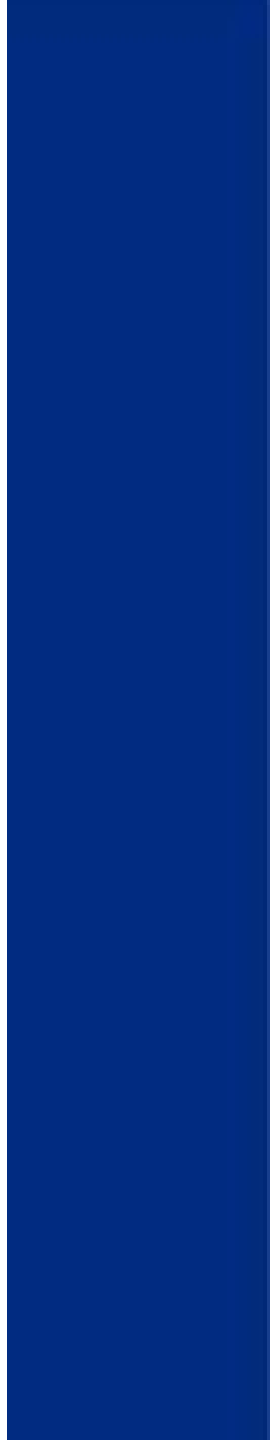




# Work Zone Collision Between a Tractor-Semitrailer and a Tennessee Highway Patrol Vehicle

Jackson, Tennessee,  
July 26, 2000









# FINDINGS

- Driver stated he may have fallen asleep
- Involved in similar accident in Utah 3 years prior
- Prior diagnoses of obstructive sleep apnea and hypothyroidism



# SAFETY ISSUES

- Inadequate medical certification process
- Lack of communication between work zone participants
- Lack of planning and coordination of traffic control responsibilities
- Inadequate training of police officers in traffic control procedures within highway work zones



# INVESTIGATIVE STAFF

- Medical Factors: Dr. Mitch Garber
- Highway Factors: Mark Bagnard
- Motor Carrier Operations: Pete Kotowski
- Public Affairs: Ted Lopatkiewicz
- Safety Recommendations: Mike O'Neill
- Writer/Editor: Debbie Curry
- Project Manager: Rafael Marshall
- Investigator-In-Charge: David Rayburn





# PARTIES TO INVESTIGATION

- The Tennessee Department of Transportation (TDOT)
- The Tennessee Highway Patrol (THP)



# PROPOSED RECIPIENTS

- Federal Highway Administration
- National Highway Traffic Safety Administration
- Tennessee Department of Transportation
- International Association of Chiefs of Police
- National Sheriff's Association





# MEDICAL ISSUES

Mitchell A. Garber,  
M.D, M.P.H, M.S.M.E.  
Medical Officer

# MEDICAL CONDITION

- Obstructive sleep apnea
- night hypoxia, interrupted breathing
- extreme daytime sleepiness, short sleep latency
- diagnosed by formal sleep study
- treatment – mask, surgery



# MEDICAL CONDITION

- Hypothyroidism
- decrease in thyroid hormone
- diminished tendon reflexes
- fatigue, sluggishness, mental
- slowing, dazed state
- associated with sleep apnea



# MEDICAL CONDITION

- 11/96 – severe leg infection, admitted to hospital
- “truck driver driving 10 hrs/d for 10 days”
- “pain, swelling, cont’d to drive”  
T 101.8, Ht. 5’11”, Wt. 358 lbs.
- “gave history c/w sleep apnea”
- “significant desaturation”



# MEDICAL CONDITION

- 12/96 – discharged: diagnoses “cellulitis, suspected OSA”
- needed “sleep study, but in need of return to employment”
- “no work for 1 week to elevate leg”
- 2 weeks later: “schedule pulmonary consult – sleep study.” No work restrictions. Study not scheduled.



# MEDICAL CONDITION

- 7/97 – “truck driver – ‘blackout’ ... accident while driving truck.”
  - “consult for sleep apnea”
  - 1 week - pulmonary consult:  
“probable OSA, sleep study high priority, no driving until sleep study done and treatment started.”





# MEDICAL CONDITION

- 8/97 – sleep study performed
  - “severe obstructive sleep apnea”
  - “masks – no significant improvement, complaints by patient”
  - “referral to ENT to consider surgical therapy”



# MEDICAL CONDITION

- 9/97 – note from non-treating doctor:  
“examined and found to be free of any disability. ...fit for safe operation of a commercial transportation vehicle.”
- 2 wks later: neck surgery for OSA
  - “difficulty swallowing, pain, swelling ...
  - avoid driving while taking narcotics”



# MEDICAL CONDITION

- 11/97 – “failed to follow-up” in pulmonary clinic, “still needs repeat sleep study.”
- Follow-up sleep study never done
- 8/98 – complained of “fatigue for 1 month, history of apnea but after surgery is sleeping better.” No restrictions noted



# MEDICAL CONDITION

- 9/98 – “hypothyroidism”
  - -weight, -TSH, sluggish reflexes”
  - “sleep apnea resolved” (no study)
  - “return to clinic 3 months,” no restrictions on driving
- 10/98 – driver physical exam: “knee jerks not elicited, hypothyroid.” No mention of sleep apnea. No restrictions



# MEDICAL CONDITION

- 8/99 – driver physical exam:
  - No mention of hypothyroidism
  - No mention of sleep apnea
  - No medications reported
  - No restrictions except glasses
- 7/00 – accident: driver thyroid hormone levels very low, 85/90 pills found from 1998 (1<sup>st</sup> of 4 refills).



# SUMMARY

- Conditions: OSA, hypothyroidism
  - driver did not tolerate mask, had complications from surgery, never tested afterwards
  - treated with replacement hormone; driver did not continue treatment



# CERTIFICATION ISSUES

- Certifying physician aware of symptomatic hypothyroidism, but no testing or restrictions recommended
- Driver changed information provided from one exam to another
- FMCSA regulations do not specify sleep apnea; no guidance whatsoever on hypothyroidism



# CERTIFICATION ISSUES

- Examinations were not reviewed
- In spite of known deficiencies in driver reporting/monitoring of medical condition prior to previous accident, only charged with “reckless driving.”
- Only one of many physicians treating driver ever suggested driving restriction for conditions, driver ignored.





# PREVIOUS RECOMMENDATIONS

1999 New Orleans accident; 22 deaths



# PREVIOUS RECOMMENDATIONS

- FMCSA/States develop comprehensive medical oversight program with:
  - Qualified, educated examiners
  - Tracking and review of medical exams
  - Updated and available guidance
  - Improved enforcement of certification requirements
  - Mechanisms for reporting unfit drivers
- States establish immunity for reporting





# MEDICAL ISSUES



# HIGHWAY ISSUES

Mark Bagnard,  
Office of Highway Safety  
Investigator

# JACKSON CONSTRUCTION PROJECT

- Included 12-miles of Interstate 40
- Phase I
  - Resurfacing the roadway
  - Installing reflective lane markers
  - Installation of guardrail

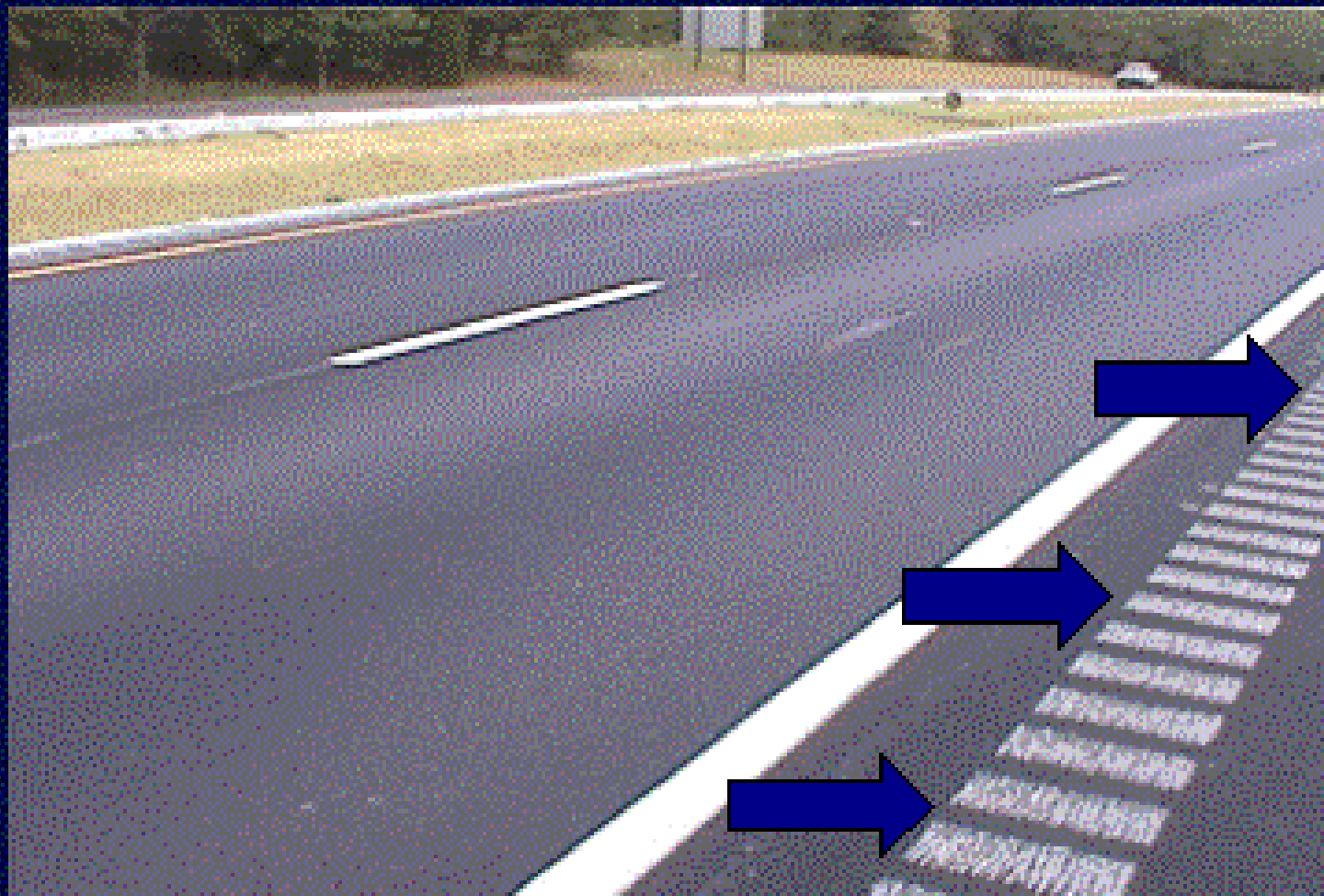


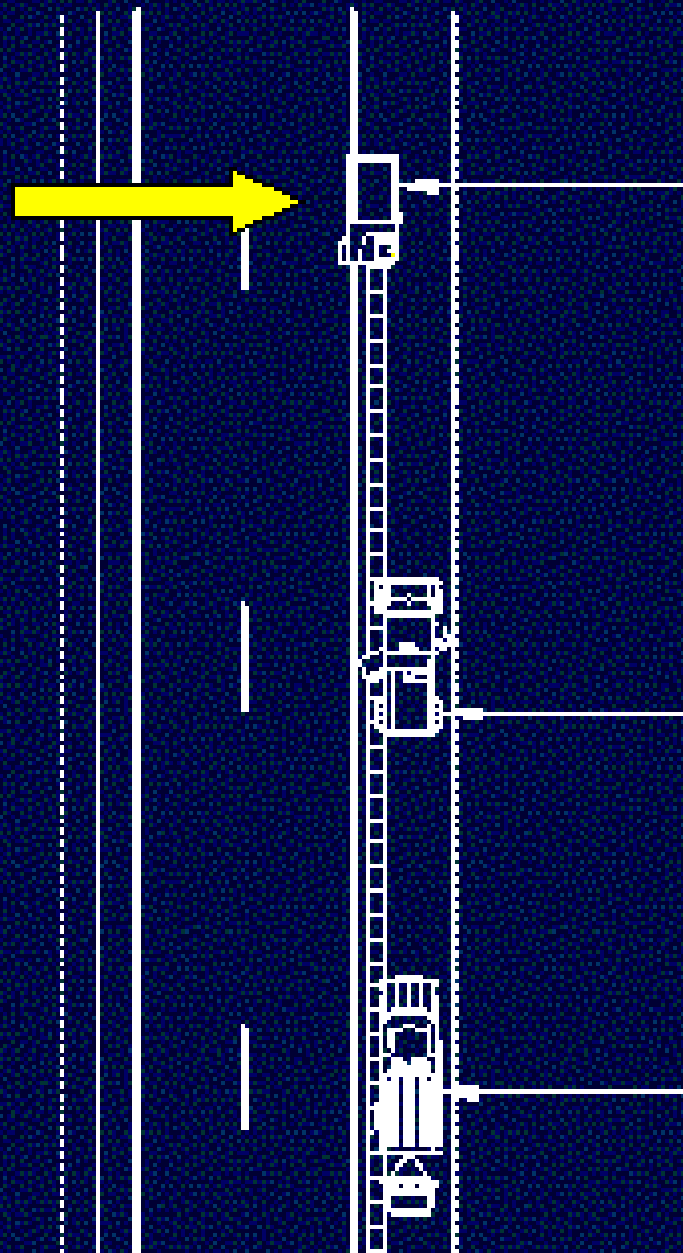
# JACKSON CONSTRUCTION PROJECT

- Phase II
  - Milling rumble strips
- Phase III
  - Painting new lane markings
- Work progressed from May through August of 2000



# PROJECT PHASE II – MILLING OPERATIONS





Machine performing milling operation (encroaches into the right traffic lane 1 to 1-1/2 feet)

Self-propelled sweeper (yellow flashing lights mounted on roof)

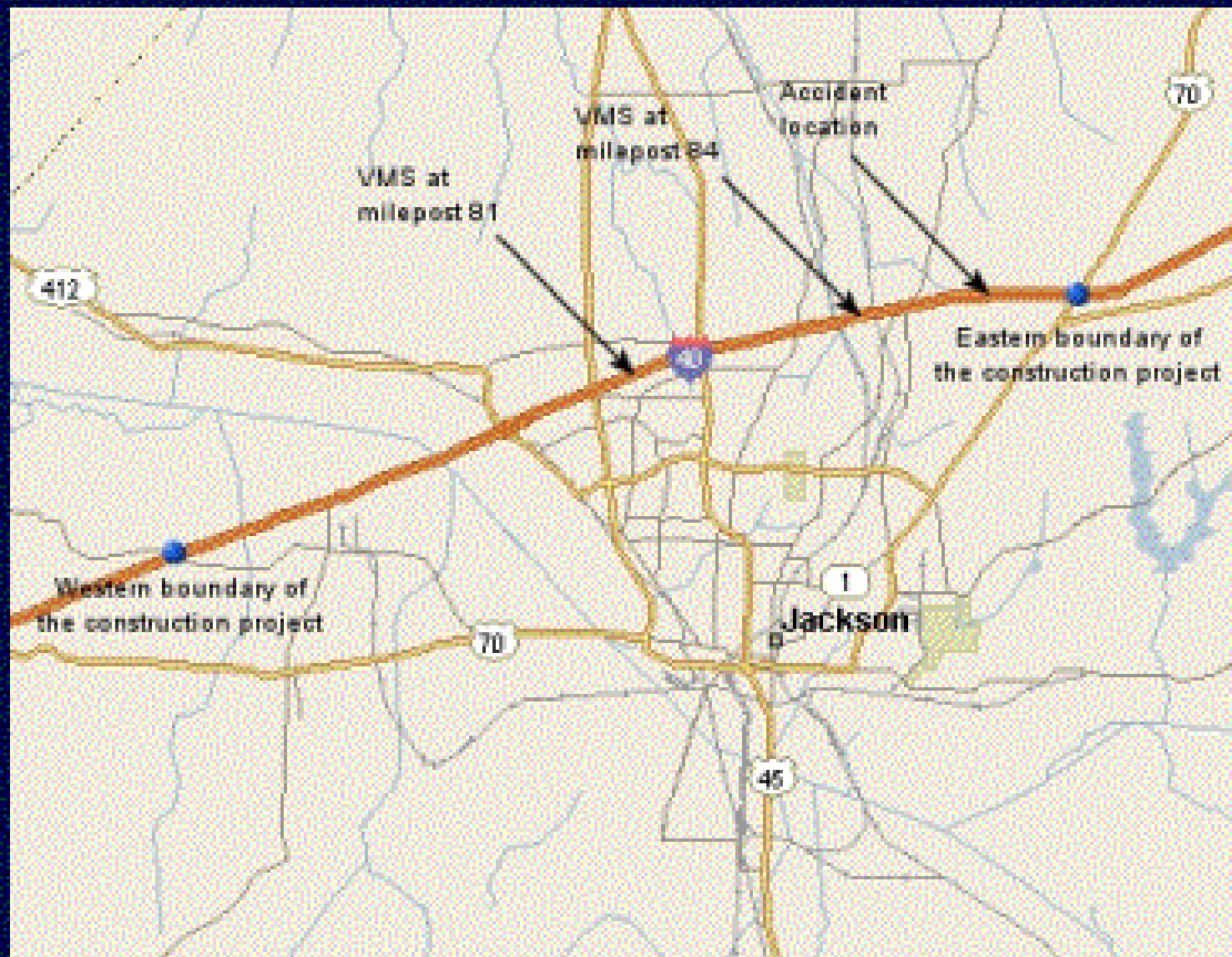
Pickup truck towing type-C arrow board (yellow flashing lights mounted on roof)

Left Traffic lane      Right Traffic lane      Right shoulder

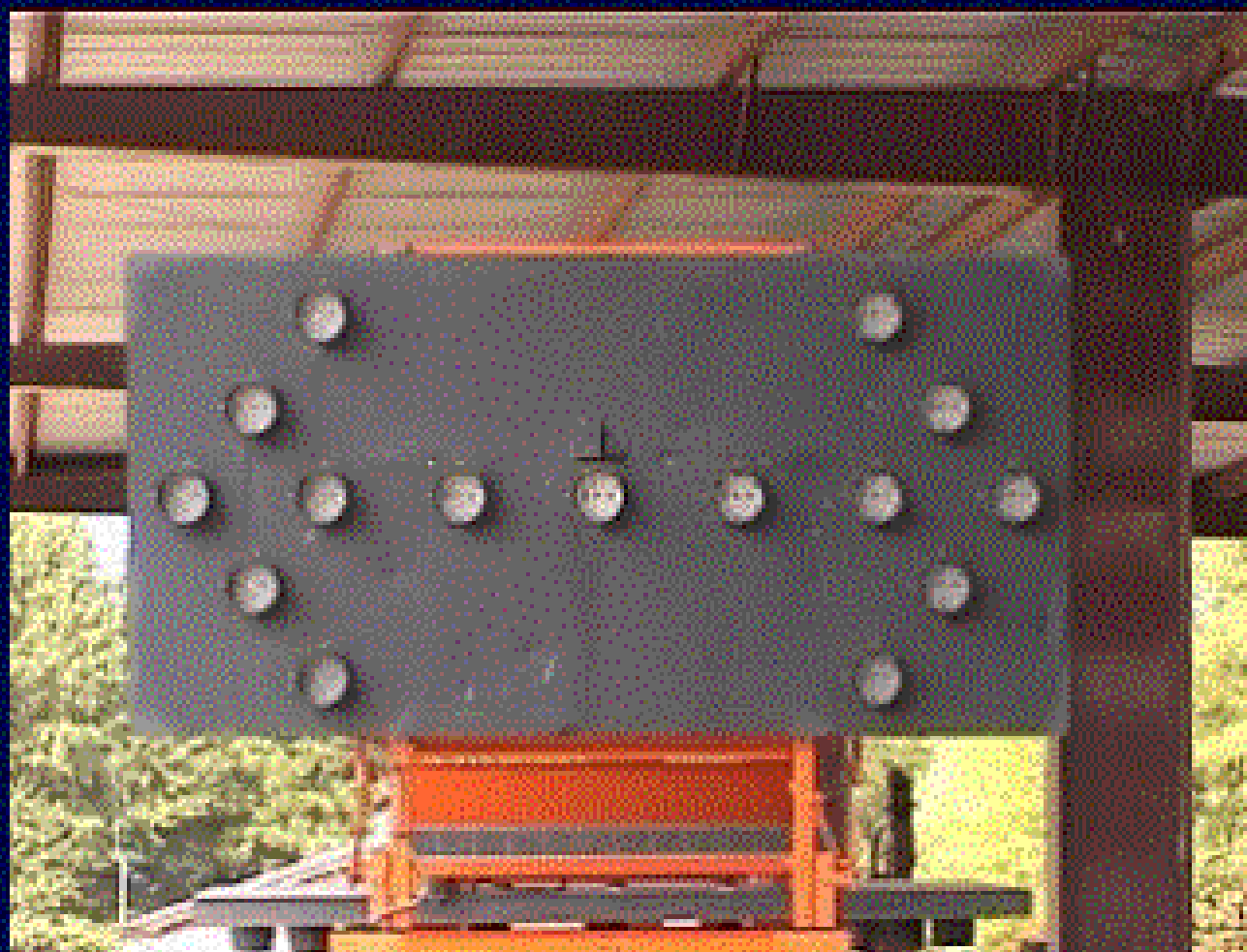


Eastbound lanes of Interstate 40









# HIGHWAY SAFETY ISSUES

- A lack of communication between the parties involved in the construction project
- No traffic control plans for the project's mobile operations



# PRE-CONSTRUCTION CONFERENCE

- Held 3-months prior to the beginning of the construction project
- A forum to discuss the scope of the project
  - Impact on surrounding area and services
  - Time requirements, resources, and procedures
  - Traffic control plans



# CONFERENCE ATTENDEES

- Tennessee Department of Transportation
- The primary contractor
- One subcontractor
- The Tennessee Highway Patrol was not invited to the conference





Construction vehicles involved in the milling operation

Highway patrol vehicles blocking the right traffic lane (emergency lights are operational)

Eastbound lanes of Interstate 40







# COMMUNICATION ISSUES

- Contractor intended all the vehicles to remain on the shoulder
- THP assumed that right traffic lane should be closed



# COMMUNICATION ISSUES

- Officer's actions did not comply with MUTCD
- Contractor did not feel it was his place to correct officers



# PLANNING AND COORDINATION

- No traffic control plans for mobile operations
- Placement of unprotected THP vehicles in roadway
- Contractor's deviation from MUTCD lane closure procedures



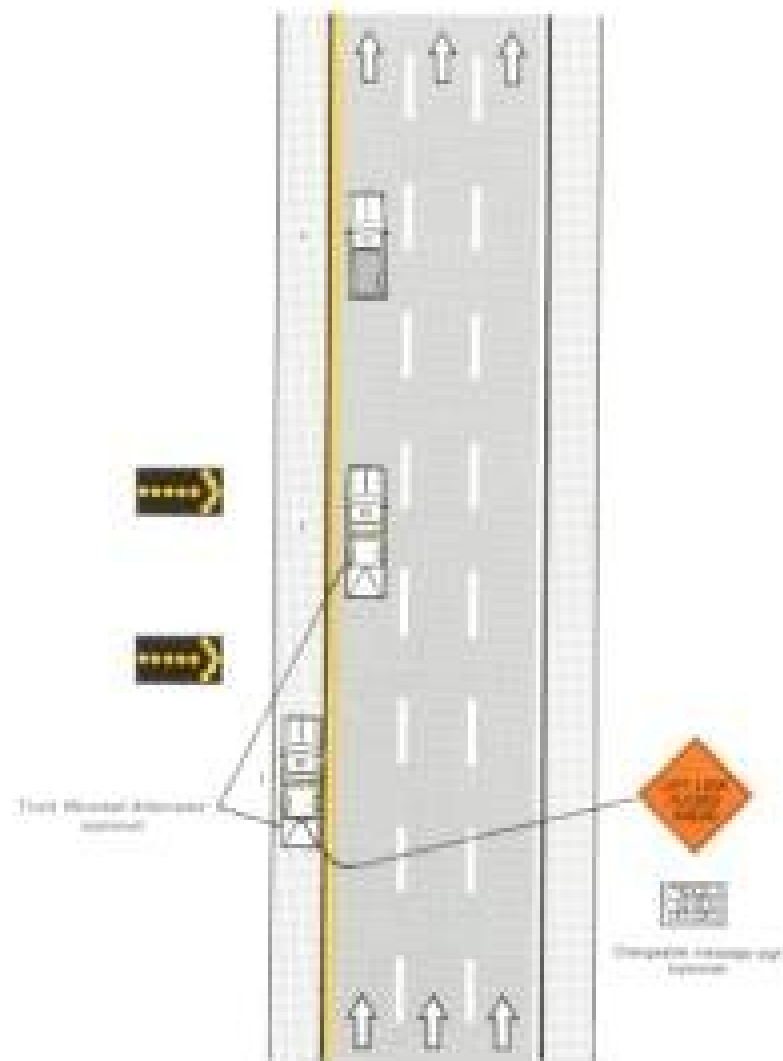


Figure 18-20 Main operation of multi-lane road





# TRAFFIC CONTROL PLAN

- Should be specific to the operation being performed
- Should include the specific responsibilities expected of each party





# HIGHWAY ISSUES



## **Training**

Rafael Marshall  
Office of Highway Safety  
Project Manager



# TENNESSEE HIGHWAY CONSTRUCTION

- Increase in major work zone projects in 1990s
- 52% increase in worker fatalities from 1995 to 1996



# PROJECT CAR

- Partnership between THP and TDOT
- Promotes motorist safety through police presence at work zones
- No training provided to officers



# THP GENERAL ORDER 405

- General procedures for manual traffic control and direction
- No procedures specific to work zone traffic control and safety



# NEED FOR TRAINING

- “Mobile lane closure” not a traffic control plan in construction contract
- THP did not ask for clarification
- Positioned vehicles in unsafe location



# POST-ACCIDENT INITIATIVES

- THP piloted courses for supervisors and officers in 2001
- FHWA piloting training course based on MUTCD (Part VI)



# FHWA/AASHTO SURVEY

- Survey on the use of police officers on highway construction projects
- Respondents
  - 46 state transportation agencies
  - 31 law enforcement agencies, highway industry associations, state legislators, and contractors



# FHWA/AASHTO SURVEY

- 2/3 use police officers for work zone projects
- 1/4 have training program in place or in development
- 1/5 provide only general traffic management training



# POLICE WORK ZONE TRAINING

- Contacted state police NJ, MD, DE, and CT
- All 4 states use police in work zones
- Only NJ trains officers in work zone safety





# NEW JERSEY PROGRAM

- Dedicated unit for work zones • Trains unit on MUTCD and OSHA
- Enforce rules and regulations on traffic control and safety



# BENEFITS OF TRAINING

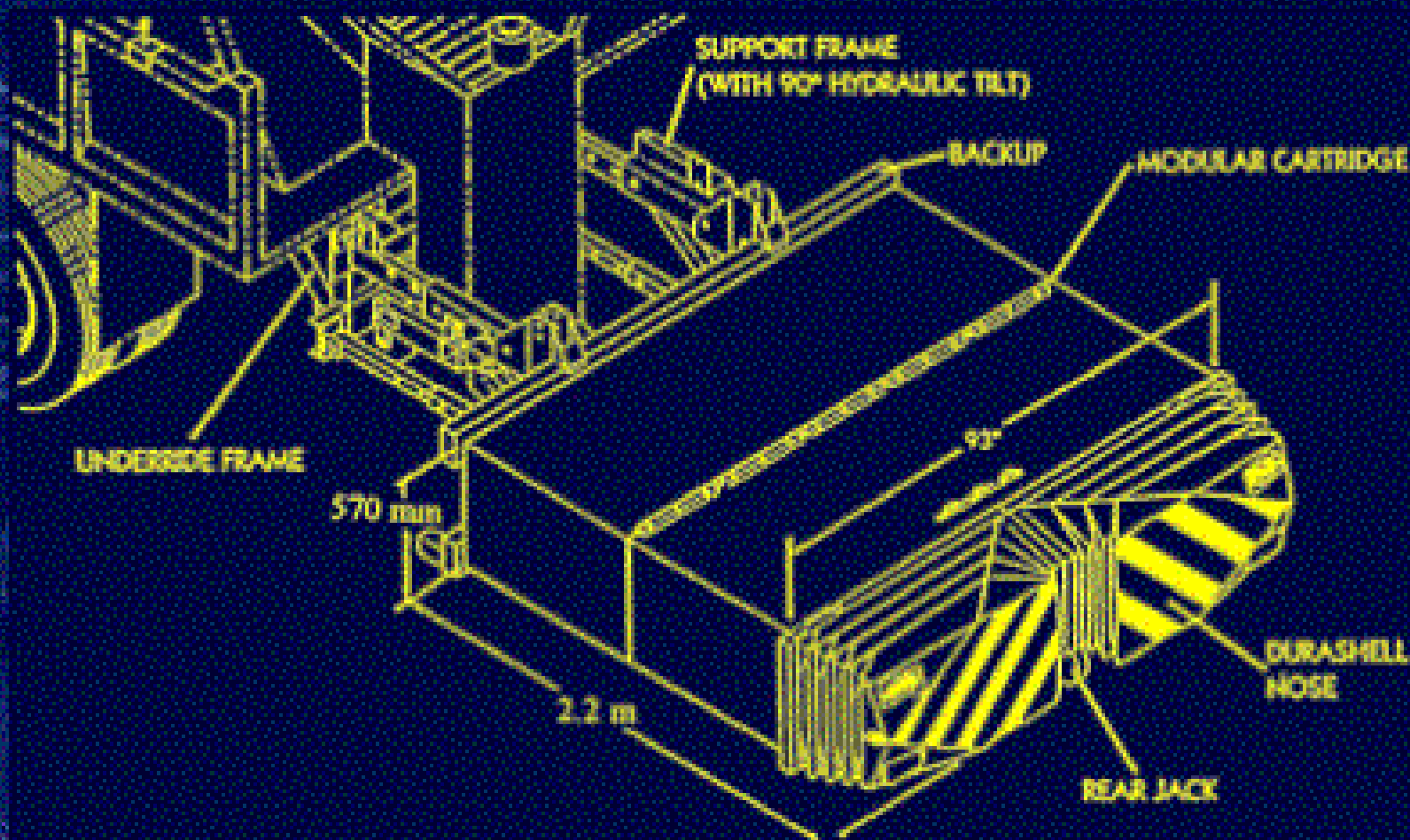
- Awareness of work zone hazards
- Understanding of work zone terminology
- Better communication and coordination





# Training

# Truck Mounted Attenuators



# Examples of Truck Mounted Attenuators



# Truck Mounted Attenuator Specifications

- NCHRP Specifications
  - Designed for vehicle weights up to 4,400 pounds
  - Designed for vehicle speeds up to 62 miles per hour



# Conclusion from 1992 Safety Study

“Truck mounted attenuators used on vehicles in moving maintenance operations and on barrier vehicles at stationary work zone sites can substantially reduce the severity of accidents in these work zones.”

